ABSTRACT

The invention comprises a method of fabricating a vacuum microtube device comprising the steps of forming a cathode layer comprising an array of electron emitters, forming a gate layer comprising an array of openings for passing electrons from the electron emitters, and forming an anode layer for receiving electrons from the emitters. The cathode gate layer and the anode layer are vertically aligned and bonded together with intervening spacers on a silicon substrate so that electrons from respective emitters pass through respective gate openings to the anode. The use of substrate area is highly efficient and electrode spacing can be precisely controlled. An optional electron multiplying structure providing secondary electron emission material can be disposed between the gate layer and the anode in the path of emitted electrons.